

We claim:

1. A method of fabricating a circuit board comprising the steps of: providing a thermal management material, applying an electrically insulating layer to at least one surface of said thermal management material, applying an electrically conductive material to said one electrically insulating layer and laminating said thermal management material, said electrically insulating layer and said electrically conductive material together with heat and pressure wherein the method of making said thermal management material further comprises the steps of cutting a thermally conductive substrate from a larger sheet of heat conducting material, degreasing said thermally conductive substrate, mechanically abrading at least one surface of said thermally conductive substrate, acid cleaning said at least one abraded surface of said thermally conductive substrate, rinsing said thermally conductive substrate, passivating said at least one abraded surface of said thermally conductive substrate to render said at least one surface chemically inert, rinsing said thermally conductive substrate, drying said thermally conductive substrate and baking said thermally conductive substrate at an elevated temperature.

2. A method as in claim 1 wherein said step of degreasing said thermally conductive, rigid substrate is accomplished by dipping said thermally conductive substrate in a solvent selected from the group comprising methyl ethyl ketone, isopropyl alcohol, methyl alcohol, perchloroethylene, trichloroethylene, methylene chloride, 1,1,1 trichloroethane and combinations thereof.

3. A method as in claim 1 wherein said step of mechanically abrading said surface is accomplished by brushing said surface with a rotating bristle brush.

4. A method as in claim 3 wherein said rotating bristle brush has bristles selected from the group comprising steel, brass, abrasive particle coated thermoplastic and combinations thereof.

5. A method as in claim 1 wherein said step of mechanically abrading said surface is accomplished by forcibly imparting particulate matter against said surface from the group comprising vapor honing, sand blasting, bead blasting or combinations thereof.

6. A method as in claim 1 wherein said step of mechanically abrading said surface is

accomplished moving an abrasive grit selected from the group comprising sanding belts and pumice stone across said surface from side to side and from end to end of said substrate.

7. A method as in claim 1 wherein said step of acid cleaning is accomplished by dipping said substrate in an acid bath solution.

5 8. A method as in claim 7 wherein said acid bath solution is selected from the group comprising hydrochloric, hydrofluoric, phosphoric, sulphuric and citric acids.

9. A method as in claim 1 wherein said step of passivating said surface is accomplished by applying at least one metal cleaning solution selected from the group comprising water based acidic aluminum alloy etchant soak mixed 5%-15% by volume w/water, a water  
10 based alkaline, non-foaming high pressure aluminum alloy spray cleaner prepared 2%-5% by volume w/water or a mixture of hydrochloric, hydrofluoric, phosphoric and nonylphenol ethoxylate soluted with water.

10. A method of making a circuit board panel comprising the steps of: providing a thermally conductive, rigid substrate, said thermally conductive substrate prepared by cutting said  
15 thermally conductive substrate from a larger sheet of heat conducting material, degreasing said thermally conductive substrate, mechanically abrading at least one surface of said thermally conductive substrate, acid cleaning said at least one abraded surface of said thermally conductive substrate, rinsing said thermally conductive substrate, passivating said at least one abraded surface of said thermally conductive substrate to render said at least one surface chemically inert, rinsing  
20 said thermally conductive substrate, drying said thermally conductive substrate and baking said thermally conductive substrate at an elevated temperature thus creating a thermal management material, applying an electrically insulating layer to one surface of said thermal management material, applying an electrically conductive material to said one electrically insulating layer and laminating said thermal management material, said electrically insulating layer and said electrically  
25 conductive material together with heat and pressure.

11. A method as in claim 10 wherein said step of degreasing said thermally conductive, rigid substrate is accomplished by dipping said thermally conductive substrate in a solvent selected from the group comprising methyl ethyl ketone, isopropyl alcohol, methyl alcohol,

perchloroethylene, trichloroethylene, methylene chloride, 1,1,1 trichloroethane and combinations thereof.

12. A method as in claim 10 wherein said step of mechanically abrading said surface is accomplished by brushing said surface with a rotating bristle brush.

5 13. A method as in claim 12 wherein said rotating bristle brush has bristles selected from the group comprising steel, brass, abrasive particle coated thermoplastic and combinations thereof.

10 14. A method as in claim 10 wherein said step of mechanically abrading said surface is accomplished by forcibly imparting particulate matter against said surface from the group comprising vapor honing, sand blasting, bead blasting or combinations thereof.

15 15. A method as in claim 10 wherein said step of mechanically abrading said surface is accomplished moving an abrasive grit selected from the group comprising sanding belts and pumice stone across said surface from side to side and from end to end of said substrate.

16 16. A method as in claim 10 wherein said step of acid cleaning is accomplished by dipping said substrate in an acid bath solution.

17. A method as in claim 16 wherein said acid bath solution is selected from the group comprising hydrochloric, hydrofluoric, phosphoric, sulphuric and citric acids.

20 18. A method as in claim 10 wherein said step of passivating said surface is accomplished by applying at least one metal cleaning solution selected from the group comprising water based acidic aluminum alloy etchant soak mixed 5%-15% by volume w/water, a water based alkaline, non-foaming high pressure aluminum alloy spray cleaner prepared 2%-5% by volume w/water or a mixture of hydrochloric, hydrofluoric, phosphoric and nonylphenol ethoxylate soluted with water.

25 19. A method as in claim 10 wherein said step of degreasing said thermally conductive, rigid substrate is accomplished by dry ice blasting.

20. In a method of making a circuit board panel comprising a heat conducting substrate, an electrically insulating layer and an electrically conductive material, said electrically insulating layer applied to at least one surface of said heat conducting substrate and said

electrically conductive material applied to said one electrically insulating layer, said heat conducting substrate, said electrically insulating layer and said electrically conductive material laminated into said circuit board panel under heat and pressure, said heat conducting substrate originally cut from a larger sheet of heat conducting material, degreased, rinsed and dried, the  
5 improvement wherein said heat conducting substrate is mechanically abraded on at least one surface thereof after degreasing said substrate, acid cleaned, rinsed, passivated to render said at least one surface chemically inert, rinsed, and baked at an elevated temperature.